

Completion and employment from entrant data (CEED) technical document

Overview

1. This document describes the methodology behind a new experimental measure known as completion and employment from entrant data (CEED), based on the existing Office for Students (OfS) measure known as Projected completion and employment from entrant data (Proceed).¹
2. Since the Proceed measure was previously described, the OfS has carried out our ‘Consultation on constructing student outcome and experience indicators for use in OfS regulation’². This included the decision to use a cohort tracking approach to completion for Proceed (now CEED) and described how the progression indicator is calculated.
3. The new CEED measure, which is based on Proceed, has now been developed at the sector-level to use these new definitions of the completion and progression indicators. It is given by the multiplication of these two indicators across various student cohorts, which acts as a measure of how likely new entrants are to complete their course and achieve a successful outcome following their studies.
4. We welcome further feedback on these experimental statistics, which can be provided via email at official.statistics@officeforstudents.org.uk.

Introduction

5. In May 2021, the OfS published an updated version of the experimental measure known as Projected completion and employment from entrant data (Proceed).³
6. The measure aimed to project the proportion of students likely to achieve a degree, based on the most recent patterns of student progression through first degree programmes, and then estimate the proportion of these who will have successful outcomes after their studies, based on recent patterns of graduate employment.
7. Proceed was derived as the multiplication of a projected completion measure (the proportion of students projected to obtain a first degree at their original provider) and a graduate progression measure (the proportion of Graduate Outcomes survey respondents in professional employment or any type of further study, or retired, travelling or caring for someone 15 months

¹ Information on the previous definition of Proceed can be found at www.officeforstudents.org.uk/publications/proceed-updated-methodology-and-results/.

² See www.officeforstudents.org.uk/publications/student-outcomes-and-teaching-excellence-consultations/outcome-and-experience-data/

³ Information on the previous definition of Proceed can be found at www.officeforstudents.org.uk/publications/proceed-updated-methodology-and-results/.

after completing their course). The resulting statistic represents a measure of how likely new entrants are to complete their course and achieve a successful outcome following their studies.

8. While the general approach has remained unchanged between the existing Proceed measure and the newly developed CEED measure, the completion indicator used in the calculation has changed. In Proceed, a projected completion measure was used. However, following the OfS's 'Consultation on constructing student outcome and experience indicators for use in OfS regulation', the decision has been made to use our cohort tracking completion indicator when calculating CEED (hence the measure no longer being named as **Projected** completion and employment from entrant data, or Proceed).⁴ In addition, this consultation also set out our updated definition for progression, which is also used in the definition of CEED.
9. This document describes the methodology behind the newly developed CEED measure at the sector-level, now aligned with our updated completion and progression indicators used in OfS regulation.

Approach

Calculation of CEED

10. CEED is given by the multiplication of two student outcomes indicators across different student cohorts:
 - a. **Completion** measures the proportion of students that were observed to have gained a higher education qualification (or were continuing in the study of a qualification) four years and 15 days after they started their course (for full-time students).
 - b. **Progression** uses responses to the Graduate Outcomes (GO) survey to report on qualifiers' labour market and other destinations 15 months after they left higher education. It is given by the proportion of qualifiers that identify managerial or professional employment, further study, or other positive outcomes among the activities that they were undertaking at the GO survey census date.
11. Full definitions of these indicators can be found in the OfS document 'Description of student outcome and experience indicators used in OfS regulation'.⁵

Populations and data sources

12. The student population used to calculate CEED is given by the populations for its two component measures.
 - a. Completion outcomes are measured by identifying a cohort of **entrants** to higher education qualifications at the provider and following them through subsequent years of their course to track how many continue in active study, or qualify in subsequent years.
 - b. Progression measures are constructed from data reported through the Graduate Outcomes survey. They report on the proportion of **qualifiers** from higher education qualifications who

⁴ See www.officeforstudents.org.uk/publications/student-outcomes-and-teaching-excellence-consultations/outcome-and-experience-data/.

⁵ Available at www.officeforstudents.org.uk/publications/description-and-definition-of-student-outcome-and-experience-measures/.

have been included on the Graduate Outcomes target list, responded to the survey, and reported that they have progressed to professional or managerial employment, further study, or other positive outcomes, 15 months after gaining their qualification.⁶

13. Both measures use the same data sources and coverage as applies across all of the student outcome and experience measures used in OfS regulation, with an additional restriction to students domiciled in the UK at the point of entry to higher education.⁷ This is different to the original Proceed measure in that we now use data from the Individualised Learner Record (ILR) as well as the Higher Education Statistics Agency (HESA) Student record and Student Alternative record.
14. Whereas the original version of Proceed was limited to full-time first degree students, the coverage of the new CEED measure could be extended to include students on different levels and modes of study. When calculating CEED for different levels and modes of study, we intend to use information at the point of entry to higher education. This is to align the population for progression with that of completion, which is measured from the point at which a student starts their course.
15. The same approach will be taken when CEED is split by student characteristics. For example, the OfS's key performance measure (KPM) 6 splits Proceed data by a measure of financial disadvantage measured at the point of entry to higher education.⁸ This is achieved by linking the completion and progression populations back to their respective higher education entrance records to identify the characteristics of the student at the point they started their course.

Academic years and cohorts

16. CEED (and Proceed before it) have been designed to indicate how likely new entrants on a higher education course are to achieve successful outcomes over the whole lifecycle of their studies. To provide the true rate of student progression from entry on a course to professional employment or other positive outcome, it would be necessary to track a starting cohort through their study and into their final destinations. Such a method in practice would require following a cohort for around 10 years after their first enrolment to allow for the whole cohort to complete their studies and transition into the workplace. The outcomes of students who started their courses around a decade earlier than the cohort of prospective students making their choices today could be very different as a result of the provision on offer to them, their experiences in higher education and the labour market prospects they face on graduation.
17. To avoid this long delay in reporting student outcomes, CEED combines the most recent completion data we hold with the most recent progression data we hold. There is no intention to match the entrant cohort (as used for completion) with the qualifying cohort (as used for progression). However, there will be some overlap between the two cohorts.
18. At the time of publication, the most recent academic year for which higher education administrative data is available is 2021-22. Meanwhile, the most recent Graduate Outcomes survey data available is for 2019-20 graduates and the earliest cohort of graduates for which

⁶ See www.hesa.ac.uk/collection/c21071/coverage.

⁷ See www.officeforstudents.org.uk/media/63061a10-939e-4cf8-8db1-82da48710023/description-of-student-outcome-and-experience-indicators-methodology.pdf#page=17&zoom=100,72,76.

⁸ Available at www.officeforstudents.org.uk/about/key-performance-measures/kpm-6-success-and-progression/.

Graduate Outcomes data exists is for those qualifying in 2017-18. We therefore have three years of progression data available, each of which can be combined with a year of completion data to calculate CEED. Table 1 below shows how the different years of data used to calculate CEED relate to one another.

Table 1: Cohorts used to calculate CEED

CEED year	Completion entrant year	Year in which full-time completion outcome known (four years after entry)	Progression qualifying year	Graduate Outcomes survey period for progression (15 months after graduation) ⁹
Year 1	2015-16	2019-20	2017-18	Between 1 December 2018 and 30 November 2019
Year 2	2016-17	2020-21	2018-19	Between 1 December 2019 and 30 November 2020
Year 3	2017-18	2021-22	2019-20	Between 1 December 2020 and 30 November 2021

19. We intend to update CEED when new data becomes available. But completion and progression data are made available at different times of the year. As such, the pairs of years used to calculate Proceed may differ from one iteration to the next.

Statistical uncertainty

20. To calculate confidence intervals around the CEED measure, we first calculate the variance for the completion and progression components of CEED independently.

21. This is done using the Beta distribution, with parameters $\alpha = np + 0.5$ and $\beta = n - np + 0.5$, where n is the denominator for the indicator (that is completion or progression) and p is the observed completion or progression rate.

22. The variance is then given by $\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$.

⁹ See an overview of survey timings: www.hesa.ac.uk/innovation/outcomes/providers/timing.

23. We then combine these two variances as follows:

$$\text{Var}(XY) = E(X)^2\text{Var}(Y) + \text{Var}(Y)\text{Var}(X) + E(Y)^2\text{Var}(X),$$

where:

- a. X is a random variable of which the completion rate is one realisation
- b. Y is a random variable of which the graduate progression rate is one realisation
- c. $\text{Var}(X)$ is the variance of the completion rate calculated using the equation above
- d. $\text{Var}(Y)$ is the variance of the graduate progression rate calculated using the equation above
- e. $E(X)$ is estimated as the completion rate
- f. $E(Y)$ is estimated as the graduate progression rate.

24. This approach assumes that the two component measures are realisations of independent random variables. Whilst there may be some covariance between the component measures and there is some overlap in the populations (as noted above), we consider that the likely effect of this is relatively small.

25. Taking the square root of this variance gives an estimate for the standard deviation for the CEED measure. The confidence intervals are then calculated using the following formula: $CI = p \pm (z_{\alpha} \frac{SD}{2})$

This is broadly aligned with our approach to estimating statistical uncertainty in other analyses.¹⁰

¹⁰ See page 14 of the document 'Description of statistical methods', available at www.officeforstudents.org.uk/publications/student-outcomes-and-teaching-excellence-consultations/outcome-and-experience-data/.